

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Develop Program and Frontend Using Framework

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level:3	Version:01
Competency Standard Title: Develop Program and Frontend Using Framework	Assessment Date (DD/MM/YY): Assessment Time:		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to create an SRS document and create a responsive web page according to the requirement for different devices.</p> <p>Assessment Task 2: Candidate is required to create a PHP based web app that will store input values & print stored values and perform testing of that application.</p> <p>And complete:</p> <ol style="list-style-type: none"> 1. Knowledge assessment test (Written or Oral) 2. Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p>

	<p>Performance Criteria 1: Organize interview sessions for clients.</p> <p>Performance Criteria 2: Prepare Software Requirement specification (SRS) Document.</p> <p>Performance Criteria 3: Prepare Prototyping or visuals based on SRS.</p> <p>Performance Criteria 4: Gather information regarding storage spaces.</p> <p>Performance Criteria 5: Verify the completeness</p> <p>Performance Criteria 6: Design mockups to implement design</p> <p>Performance Criteria 7: Identify different types of screens and hand-held devices</p> <p>Performance Criteria 8: Implement the mockups to all screen sizes through frontend frameworks</p> <p>Performance Criteria 9: Apply media queries to the layouts</p>
	<p>Assessment Task 2</p> <p>Performance Criteria 1: Configure environment for PHP development</p> <p>Performance Criteria 2: Write basic PHP program</p> <p>Performance Criteria 3: Create web page using PHP</p> <p>Performance Criteria 4: Perform User interface testing</p> <p>Performance Criteria 5: Perform Unit testing</p> <p>Performance Criteria 6: Perform Compatibility testing</p> <p>Performance Criteria 7: Perform security testing</p> <p>Performance Criteria 8: Perform performance testing</p> <p>Performance Criteria 9: Debug code using debugger</p> <p>Performance Criteria 10: Perform validation and verification testing</p> <p>Performance Criteria 11: Collaborate with teams to fix and improve products</p> <p>Performance Criteria 12: Check software is up-to-date with latest technologies</p>
	<p>Portfolios required at the time of assessment (if any) for</p>

Assessors Judgment Guide

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to create an SRS document and create a responsive web page according to the requirement for different devices.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Organize interview sessions for clients.			
2. Prepare Software Requirement specification (SRS) Document.			
3. Prepare Prototyping or visuals based on SRS.			
4. Gather information regarding storage spaces.			
5. Verify the completeness			
6. Design mockups to implement design			
7. Identify different types of screens and hand-held devices			
8. Implement the mockups to all screen sizes through frontend frameworks			
9. Apply media queries to the layouts			
Competent <input type="checkbox"/>	Not Yet Competent <input type="checkbox"/>		
Each Assessment Task (with performance criteria)			

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to create a PHP based web app that will first store input values & print stored values and perform testing of that application.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Configure environment for PHP development			
2.	Write basic PHP program			
3.	Create web page using PHP			
4.	Perform User interface testing			
5.	Perform Unit testing			
6.	Perform Compatibility testing			
7.	Perform security testing			
8.	Perform performance testing			
9.	Debug code using debugger			
10.	Perform validation and verification testing			
11.	Collaborate with teams to fix and improve products			
12.	Check software is up-to-date with latest technologies			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop Program and Frontend Using Framework	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. What are the three components of a web page?	
2. Define PEAR in PHP	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
3. Define Unit Testing and Integration testing	
4. What is Debugging	
5. Difference between HTML and CSS	
6. Define Bootstrap and its usage	

ANSWER KEY

Sr.	Answers
1.	The Three Basic Components of a Website 1. A Domain. 2. Hosting. 3. A Content Management System (CMS)
2.	PHP Extension and Application Repository is a framework and distribution system for reusable PHP components
3.	In unit testing every module test independently, while in integration testing all module test combined
4.	Debugging is the process of finding and resolving bugs (defects or problems that prevent correct operation) within computer programs, software, or systems.
5.	HTML is used to structure the content on the web page. CSS is used to add style to the content of a web page.
6.	Bootstrap is a free and open-source front end development framework for the creation of websites and web apps.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

**Develop and Integrate Database With Web
Applications**

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop And Integrate Database With Web Applications	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to create and administrate a database with two tables that will store student name in first table and final grade in the second table and create a backup of this database and restore from that backup.</p> <p>And complete:</p> <ol style="list-style-type: none"> 1. Knowledge assessment test (Written or Oral) 2. Portfolios at the time of assessment (if any)

Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Create database entities</p> <p>Performance Criteria 2: Specify primary keys</p> <p>Performance Criteria 3: Set up the table and relationships among database entities</p> <p>Performance Criteria 4: Create and manage database reports, visualizations, and dashboards.</p> <p>Performance Criteria5: Install and maintain the database servers.</p> <p>Performance Criteria 6: Develop processes for optimizing database security.</p> <p>Performance Criteria 7: Manage database access rights and controls.</p> <p>Performance Criteria 8: Diagnose and troubleshoot database errors.</p> <p>Performance Criteria 9: Create automation for repeating database tasks</p> <p>Performance Criteria 10: Export the database backups</p> <p>Performance Criteria 11: Restore database backups</p>
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Assessors Judgment Guide

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to create and administrate a database with two tables that will store student name in first table and grade in the second table and create a backup of this database and restore from that backup.			
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Create database entities			
2.	Specify primary keys			
3.	Set up the table and relationships among database entities			
4.	Create and manage database reports, visualizations, and dashboards.			
5.	Install and maintain the database servers.			
6.	Develop processes for optimizing database security.			
7.	Manage database access rights and controls.			
8.	Diagnose and troubleshoot database errors.			
9.	Create automation for repeating database tasks			
10.	Export the database backups			
11.	Restore database backups			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Develop And Integrate Database With Web Applications	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Differentiate DBMS and database	
2. Define Relational database	
3. Describe database models	
4. Define ACID property	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)

5. Define DDL , DML and DCL	
6. Define Backup/recovery	
7. How to implement Database Security	
8. Differentiate DBMS and database	

ANSWER KEY

Sr.	Answers
1.	A database is any collection of data and DBMS is a piece of software that manages databases.
2.	A relational database is a collection of data items with pre-defined relationships between them. These items are organized as a set of tables with columns and rows.
3.	A database model shows the logical structure of a database, including the relationships and constraints that determine how data can be stored and accessed.
4.	ACID refers to the four key properties of a transaction: atomicity, consistency, isolation, and durability.
5.	DDL (Data definition language) defines your database structure. DML (Data Manipulation Language) i.e. basic functionalities like INSERT, UPDATE, DELETE and MODIFY data in database. DCL (Data Control Language) controls you DML and DDL statements
6.	Backup and recovery describes the process of creating and storing copies of data that can be used to protect organizations against data loss.
7.	Restricting unauthorized access and use by implementing strong and multifactor access and data management controls.
8.	A database is any collection of data and DBMS is a piece of software that manages databases.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Make Rectifier Using Diodes

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Make Rectifier Using Diodes	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to construct half wave and full wave centre tapped rectifier.</p> <p>Assessment Task 2: Candidate is required to make voltage regulator using Zener diode.</p> <p>Assessment Task 3: Candidate is required to construct Seven Segment Display Using Light Emitting Diode.</p> <p>And complete:</p> <ol style="list-style-type: none"> Knowledge assessment test (Written or Oral) Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Identify Resistors and resistance</p> <p>Performance Criteria 2: Identify Capacitor & capacitance</p> <p>Performance Criteria 3: Identify an Inductor and its inductance</p> <p>Performance Criteria 4: Identify the Diodes as per polarity</p> <p>Performance Criteria 5: Identify IC's and its Packages</p> <p>Performance Criteria 6: Construct circuit Diagram of half wave Rectifier</p> <p>Performance Criteria 7: Construct circuit Diagram of Full Wave Rectifier</p> <p>Performance Criteria 8: Calculate the ripple Factor</p> <p>Performance Criteria 9: Calculate output voltage using proper formulas</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Draw the voltage Regulator circuit</p> <p>Performance Criteria 2: Select the Zener diode and components as per requirement for voltage regulator</p> <p>Performance Criteria 3: Install the components for voltage regulator circuits.</p> <p>Performance Criteria 4: Vary the input voltage and note down the effects on output.</p> <p>Performance Criteria 5: Record the difference between input and output</p>
	<p>Assessment Task 3</p> <p>Performance Criteria 1: Draw the Seven Segment Display Circuit</p> <p>Performance Criteria 2: Construct Seven Segment Display Circuit using components.</p> <p>Performance Criteria 3: Verify the numeric digits on Seven Segment Display by providing proper input to its terminal</p>

Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							
Each Assessment Task (with performance criteria)							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to construct half wave and full wave centre tapped rectifier		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Identify Resistors and resistance			
2.	Identify Capacitor & capacitance			
3.	Identify an Inductor and its inductance			
4.	Identify the Diodes as per polarity			
5.	Identify IC's and its Packages			
6.	Construct circuit Diagram of half wave Rectifier			
7.	Construct circuit Diagram of Full Wave Rectifier			
8.	Calculate the ripple Factor			
9.	Calculate output voltage using proper formulas			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to make voltage regulator using Zener diode		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Draw the voltage Regulator circuit			
2.	Select the Zener diode and components as per requirement for voltage regulator			
3.	Install the components for voltage regulator circuits.			
4.	Vary the input voltage and note down the effects on output.			
5.	Record the difference between input and output			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 3		Description of Assessment Task 3		
		Candidate is required to construct Seven Segment Display Using Light Emitting Diode.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Draw the Seven Segment display circuit			
2.	Construct Seven Segment display circuit using components.			
3.	Verify the numeric digits on Seven Segment display by providing proper input to its terminal			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Make Rectifier Using Diodes	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. What is diode and its types?	
2. Define resistor and its function?	
3. What is capacitor and its function?	
4. What is series and parallel circuit?	
5. Write the use of oscilloscope.	

ANSWER KEY

Sr.	Answers
1.	A diode is a two terminal electrical device and made from a semiconductor, most often silicon but sometimes germanium. There are various types of diodes e.g. Zener, Rectifier, Schottky, Transient Voltage Suppressor, Thyristor, Silicon Controlled Rectifier, and TRIAC etc.
2.	It is an electronic component that limits or regulates the flow of current in a circuit. The function of resistor to control the flow of current to other components of a circuit.
3.	A capacitor is an electronic component that is used to store electrical charge in the form of electrostatic field. The function of capacitor is to keep the positive and negative charges separated from each other.
4.	Series circuits are basic types of electrical circuits in which all components are joined in a sequence so that the same current flows through all of them. In a parallel circuit, the voltage across each of the components is the same, and the total current is the sum of the currents flowing through each component.
5.	An oscilloscope is an instrument that graphically displays electrical signals and shows how those signals change over time. It is also used to measure voltage waves.
Competent <input type="checkbox"/> Not Yet Competent <input type="checkbox"/>	

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

**Use of Bipolar Junction Transistor (BJT)
and MOSFET in Circuits**

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Use of Bipolar Junction Transistor (BJT) and MOSFET in Circuits	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to identify the type of transistor and use BJT as an operational amplifier</p> <p>Assessment Task 2: Candidate is required to implement MOSFET as a switch with one LED</p> <p>And complete:</p> <ol style="list-style-type: none"> 1. Knowledge assessment test (Written or Oral) 2. Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Identify the type of transistor.</p> <p>Performance Criteria 2: Identify the base collector & Emitter of transistors.</p> <p>Performance Criteria 3: Perform the standard Biasing of PNP & NPN Transistor</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Performance Criteria 1: Identify the Gate, Drain & Source of FET.</p> <p>Performance Criteria 2: Insert the FET on bread board.</p> <p>Performance Criteria 3: Perform the standard Biasing of (N-Channel, P Channel) FET.</p> <p>Performance Criteria 4: Measure the Gate-Source voltage (V_{gs}) & Threshold Voltage (V_{th})</p> <p>Performance Criteria 5: Draw switching circuit of MOSFET.</p> <p>Performance Criteria 6: Construct switching circuit using MOSFET</p> <p>Performance Criteria 7: Insert the components bread board.</p> <p>Performance Criteria 8: Verify switching operation of MOSFET using LED.</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1		
	Candidate is required to identify the type of transistor and use BJT as an operational amplifier.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Identify the type of transistor.	<input type="checkbox"/>	<input type="checkbox"/>	
2. Identify the base collector & Emitter of transistors.	<input type="checkbox"/>	<input type="checkbox"/>	
3. Perform the standard Biasing of PNP & NPN Transistor	<input type="checkbox"/>	<input type="checkbox"/>	
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Assessment Task 2	Description of Assessment Task 2		
	Candidate is required to implement MOSFET as a switch with one LED		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Identify the Gate, Drain & Source of FET.	<input type="checkbox"/>	<input type="checkbox"/>	
2. Insert the FET on bread board.	<input type="checkbox"/>	<input type="checkbox"/>	
3. Perform the standard Biasing of (N-Channel, P Channel) FET.	<input type="checkbox"/>	<input type="checkbox"/>	
4. Measure the Gate-Source voltage (V _{gs}) & Threshold Voltage (V _{th})	<input type="checkbox"/>	<input type="checkbox"/>	
5. Draw switching circuit of MOSFET.	<input type="checkbox"/>	<input type="checkbox"/>	
6. Construct switching circuit using MOSFET	<input type="checkbox"/>	<input type="checkbox"/>	
7. Insert the components bread board.	<input type="checkbox"/>	<input type="checkbox"/>	
8. Verify switching operation of MOSFET using LED.	<input type="checkbox"/>	<input type="checkbox"/>	
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Use of Bipolar Junction Transistor (BJT) and MOSFET in Circuits	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Identify type of transistor	
2. Define the Gate, Drain & Source of FET	
3. Define semiconductor	
4. Define basics of Coupling Capacitor	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
5. What is biasing?	

ANSWER KEY

Sr.	Answers
1.	Transistors are basically classified into two types. They are: Bipolar Junction Transistors (BJT) and Field Effect Transistors (FET).
2.	FETs are devices with three terminals: source, gate, and drain. FETs control the flow of current by the application of a voltage to the gate
3.	Semiconductors are materials which have a conductivity between conductors (generally metals) and nonconductors or insulators
4.	A coupling capacitor is a capacitor that is used to transmit an alternating current signal from one node to another
5.	Biasing is the application of dc voltage in a circuit to establish a fixed level of voltage or current.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

**Apply Thyristors (Uni Junction Transistor,
Diac and Triac) in Various Application
(Formative Assessment)**



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Apply Thyristors (Uni Junction Transistor, Diac and Triac) in Various Application	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to construct the following</p> <ol style="list-style-type: none"> a. Relaxation oscillator using UJT b. Construct switching circuit using SCR <p>Assessment Task 2: Candidate is required to draw schematic diagram of dimmer circuit and construct dimmer circuit using TRIAC & DIAC.</p> <p>Assessment Task 3: Candidate is required to construct full wave converter and observe natural commutation.</p> <p>And complete:</p> <ol style="list-style-type: none"> 1. Knowledge assessment test (Written or Oral) 2. Portfolios at the time of assessment (if any)

Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Select the components for relaxation oscillator.</p> <p>Performance Criteria 2: Construct the relaxation oscillator circuit on bread board using given diagram.</p> <p>Performance Criteria 3: Vary the value of input resistor and record the effect on output.</p> <p>Performance Criteria 4: Select the components for SCR switching circuit.</p> <p>Performance Criteria 5: Construct the SCR switching circuit on bread board</p> <p>Performance Criteria 6: Verify switching operation by triggering the SCR</p>
	<p>Assessment Task 2</p> <p>Performance Criteria 1: Draw the Schematic diagram of dimmer circuit using TRIAC & DIAC.</p> <p>Performance Criteria 2: Select the components for dimmer circuit.</p> <p>Performance Criteria 3: Construct the dimmer circuit using given TRIAC & DIAC diagram.</p> <p>Performance Criteria 4: Connect the circuit with AC supply.</p> <p>Performance Criteria 5: Vary the potentiometer and record the effect on load (Fan or Lamp)</p>
	<p>Assessment Task 3</p> <p>Performance Criteria 1: Make connection as per diagram.</p> <p>Performance Criteria 2: Apply triggering pulse at the gate of SCR.</p> <p>Performance Criteria 3: Connect oscilloscope across the load resistor and record the output wave shape</p>

Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1 Candidate is required to construct the following a. relaxation oscillator using UJT b. Construct switching circuit using SCR		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Select the components for relaxation oscillator.			
2.	Construct the relaxation oscillator circuit on bread board using given diagram.			
3.	Vary the value of input resistor and record the effect on output.			
4.	Select the components for SCR switching circuit.			
5.	Construct the SCR switching circuit on bread board			
6.	Verify switching operation by triggering the SCR			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2 Candidate is required to draw schematic diagram of dimmer circuit and construct dimmer circuit using TRIAC & DIAC.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Draw the Schematic diagram of dimmer circuit using TRIAC & DIAC.			
2.	Select the components for dimmer circuit.			
3.	Construct the dimmer circuit using given TRIAC & DIAC diagram.			
4.	Connect the circuit with AC supply.			
5.	Vary the potentiometer and record the effect on load (Fan or Lamp)			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 3		Description of Assessment Task 3 Candidate is required to construct full wave converter and observe natural commutation.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Make connection as per diagram.			
2.	Apply triggering pulse at the gate of SCR.			
3.	Connect oscilloscope across the load resistor and record the output wave shape			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Apply Thyristors (Uni Junction Transistor, Diac and Triac) in Various Application	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define oscillator using UJT	
2. Define Thyristors	
3. Define Dimmer	
4. What is Potentiometer	
5. Define SCR?	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)

6. Define triggering of SCR.

ANSWER KEY

Sr.	Answers
1.	UJT relaxation oscillator is a type of RC (resistor-capacitor) oscillator where the active element is a UJT (uni-junction transistor).
2.	A thyristor is a solid-state semiconductor device with four layers of alternating P- and N-type materials
3.	Dimmers are devices connected to a light fixture and used to lower the brightness of light.
4.	A potentiometer is a type of position sensor that is used to find the value of voltage in a circuit and to control electrical devices like volume control and joysticks etc. It has three terminals.
5.	The electric name of Silicon controlled or the semiconductor controlled rectifier (SCR) is Thyristor. SCRs are responsible for conducting the flow of current in a single direction.
6.	The turning on Process of the SCR is known as Triggering. When the SCR is switching in forward blocking state to forward conduction state which means OFF state to ON state, then it is called SCR turn ON methods or SCR triggering.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Verify Truth Tables of Digital Gates

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Verify Truth Tables of Digital Gates	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to verify truth tables of AND and OR gates</p> <p>Assessment Task 2: Candidate is required to verify truth tables of NOT, NAND and NOR gates</p> <p>Assessment Task 3: Candidate is required to verify truth tables of X-OR and X-NOR gates</p> <p>And complete:</p> <ol style="list-style-type: none"> 1. Knowledge assessment test (Written or Oral) 2. Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Place (AND gate IC) on bread board.</p> <p>Performance Criteria 2: Place (OR gate IC) on bread board.</p> <p>Performance Criteria 3: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 4: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 5: Record & verify the output result against each given input.</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Place (NOT gate IC) on bread board.</p> <p>Performance Criteria 2: Place (NAND gate IC) on bread board.</p> <p>Performance Criteria 3: Place (NOR gate IC) on bread board.</p> <p>Performance Criteria 4: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 5: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 6: Record & verify the output result against each given input.</p>
	<p>Assessment Task 3</p> <p>Performance Criteria 1: Place (X-OR gate IC) on bread board.</p> <p>Performance Criteria 2: Place (X-NOR gate IC) on bread board.</p> <p>Performance Criteria 3: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 4: Connect LED to the output pin of IC and apply different logics ant input pins.</p> <p>Performance Criteria 5: Record & verify the output result against each given input.</p>

Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to verify truth tables of AND and OR gates		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Place (AND gate IC) on bread board.			
2.	Place (OR gate IC) on bread board.			
3.	Identify the input, output, Vcc and ground pin.			
4.	Connect LED to the output pin of IC and apply different logics ant input pins.			
5.	Record & verify the output result against each given input.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to verify truth tables of NOT, NAND and NOR gates		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Place (NOT gate IC) on bread board.			
2.	Place (NAND gate IC) on bread board.			
3.	Place (NOR gate IC) on bread board.			
4.	Identify the input, output, Vcc and ground pin.			
5.	Connect LED to the output pin of IC and apply different logics ant input pins.			
6.	Record & verify the output result against each given input.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 3		Description of Assessment Task 3		
		Candidate is required to verify truth tables of X-OR and X-NOR gates		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Place (X-OR gate IC) on bread board.			
2.	Place (X-NOR gate IC) on bread board.			
3.	Identify the input, output, Vcc and ground pin.			
4.	Connect LED to the output pin of IC and apply different logics ant input pins.			
5.	Record & verify the output result against each given input.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Verify Truth Tables of Digital Gates	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define Universal gate and enlist its types	
2. What do you know about complements 1's and 2's?	
3. Why XOR is not a universal gate?	
4. Define Truth table	
5. Define logic gates and its types	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)

6. Difference between NAND, AND GATES	
7. Difference between XOR , OR Gates	
8. Enlist the names of Binary Operators	

ANSWER KEY

Sr.	Answers
1.	A universal gate is a gate which can implement any Boolean function without need to use any other gate type
2.	1's complement of binary number 110010 is 001101. To get 2's complement of binary number is 1's complement of given number plus 1 to the least significant bit (LSB). For example 2's complement of binary number 10010 is $(01101) + 1 = 01110$
3.	Exclusive-OR gate or the Exclusive-NOR gate can be classed as a universal logic gate as they cannot be used on their own or together to produce any other Boolean function.
4.	A truth table is a mathematical table used to determine if a compound statement is true or false. In a truth table, each statement is typically represented by a letter or variable, like p, q, or r,
5.	A logic gate is a basic building block of a digital circuit that has two inputs and one output. There are seven basic logic gates: AND, OR, XOR, NOT, NAND, NOR, and XNOR
6.	In digital electronics, a NAND gate (NOT-AND) is a logic gate which produces an output which is false only if all its inputs are true. AND gate is an electrical circuit that combines two signals so that the output is on if both signals are present.
7.	In XOR output is a logical "1" if either of its inputs are 1, but not at the same time (exclusively). OR gate is a digital logic gate that gives an output of 1 when any of its inputs are 1, otherwise 0.
8.	There are four main types of binary operations which are: <ul style="list-style-type: none">• Binary Addition.• Binary Subtraction.• Binary Multiplication.• Binary Division.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

**Construct & Verify Combinational Logic
Circuit**

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Construct & Verify Combinational Logic Circuit	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to make K-map to express Boolean algebra and construct logic circuits.</p> <p>Assessment Task 2: Candidate is required to construct & verify the truth table of</p> <ol style="list-style-type: none"> i. Half adder/subtractor. ii. Full adder/subtractor. <p>Assessment Task 3: Candidate is required to authenticate decoder and encoder.</p> <p>Assessment Task 4: Candidate is required to operate seven segment display with seven segment decoder.</p> <p>Assessment Task 5: Candidate is required to verify multiplexer and De-multiplexer</p> <p>And complete:</p> <ol style="list-style-type: none"> 3. Knowledge assessment test (Written or Oral) 4. Portfolios at the time of assessment (if any)

Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Apply Boolean algebra & Karnaugh mapping to simplify SOP & POS.</p> <p>Performance Criteria 2: Construct logic circuits with simplified SOP & POS.</p>
	<p>Assessment Task 2</p> <p>Performance Criteria 1: Place (AND gate IC) & (XOR gate IC) on bread board.</p> <p>Performance Criteria 2: Connect LED to the output pin of IC and apply different logics at input pins.</p> <p>Performance Criteria 3: Record & verify the output result against each given input</p> <p>Performance Criteria 4: Design, Construct, and test a half-adder circuit using one XOR gate and two NAND gates.</p> <p>Performance Criteria 5: Design, Construct, and test a full-adder circuit using two ICS, &7486 and &7400.</p>
	<p>Assessment Task 3</p> <p>Performance Criteria 1: Connect LED to the output pin of IC and apply different logics at input pins.</p> <p>Performance Criteria 2: Record & verify the output result against each given input.</p> <p>Performance Criteria 3: Place (Encoder IC) on bread board.</p> <p>Performance Criteria 4: Connect LED to the output pin of IC and apply different logics at input pins.</p> <p>Performance Criteria 5: Record & verify the output result against each given input.</p>
	<p>Assessment Task 4</p> <p>Performance Criteria 1: Insert (7 segment decoder IC) and 7 segment display on bread board.</p> <p>Performance Criteria 2: Identify the input, output, Vcc and ground pin.</p> <p>Performance Criteria 3: Connect segment display with seven segment decoder input output pins.</p> <p>Performance Criteria 4: Record & verify the output result against each given input.</p>

	Assessment Task 5 Performance Criteria 1: Perform multiplexing Performance Criteria 2: Perform DE-multiplexing.
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to make K-map to express Boolean algebra and construct logic circuits.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Apply Boolean algebra & Karnaugh mapping to simplify SOP & POS.			
2.	Construct logic circuits with simplified SOP & POS.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to construct & verify the truth table of		
		i. Half adder/subtractor. ii. Full adder/subtractor.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Place (AND gate IC) & (XOR gate IC) on bread board.			
2.	Connect LED to the output pin of IC and apply different logics at input pins.			
3.	Record & verify the output result against each given input			
4.	Design, Construct, and test a half-adder circuit using one XOR gate and two NAND gates.			
5.	Design, Construct, and test a full-adder circuit using two ICS, &7486 and &7400.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 3		Description of Assessment Task 3		
		Candidate is required to authenticate decoder and encoder.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Connect LED to the output pin of IC and apply different logics at input pins.			
2.	Record & verify the output result against each given input.			
3.	Place (Encoder IC) on bread board.			
4.	Connect LED to the output pin of IC and apply different logics at input pins.			
5.	Record & verify the output result against each given input.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 4		Description of Assessment Task 4		
		Candidate is required to operate seven segment display with seven segment decoder.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Insert (7 segment decoder IC) and 7 segment display on bread board.			
2.	Identify the input, output, Vcc and ground pin.			
3.	Connect segment display with seven segment decoder input output pins.			
4.	Record & verify the output result against each given input.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 5		Description of Assessment Task 5		
		Candidate is required to verify multiplexer and De- multiplexer		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Perform DE-multiplexing			
2.	Perform DE-multiplexing			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Construct & Verify Combinational Logic Circuit	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define laws and rules of Boolean algebra	
2. Define the combinational logic circuits?	
3. Knowledge of Don't-Care Conditions	
4. Define Karnaugh Map?	
5. Define Decoders & Encoders & Multiplexers?	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)

6. Describe seven-segment display?

ANSWER KEY

Sr.	Answers
1.	A set of rules or Laws of Boolean Algebra are used to help reduce the number of logic gates needed to perform a particular logic operation resulting in a list of functions or theorems known commonly as the Laws of Boolean Algebra.
2.	Combinational Logic Circuits are memoryless digital logic circuits whose output at any instant in time depends only on the combination of its inputs.
3.	The “Don’t Care” conditions allow us to replace the empty cell of a K-Map to form a grouping of the variables which is larger than that of forming groups without don’t care.
4.	A tool for representing Boolean function variables. K-maps are tables of rows and columns with entries represent 1`s or 0's.
5.	The digital circuits that perform encoding of digital information are called encoders while digital circuits that decode the coded digital information are called decoders. A multiplexer is a combinational circuit that provides single output but accepts multiple data inputs.
6.	A seven-segment display is a form of electronic display device for displaying decimal numerals that is an alternative to the more complex dot matrix displays.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Construct and Verify Function of Flip Flops

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Construct and Verify Function of Flip Flops	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to construct and verify the truth table of RS latch using NAND gate and clocked RS latch using NAND gate.</p> <p>Assessment Task 2: Candidate is required to verify function of D flip flop and JK/T flip flop</p> <p>And complete:</p> <ol style="list-style-type: none"> 5. Knowledge assessment test (Written or Oral) 6. Portfolios at the time of assessment (if any)
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Connect LEDs to outputs pins.</p> <p>Performance Criteria 2: Apply different logic inputs to Record & verify the output result against each given input for RS latch and clocked RS latch.</p>
	<p>Assessment Task 2</p> <p>Performance Criteria 1: Connect LEDs\ Scope to outputs pins.</p> <p>Performance Criteria 2: Apply different logic inputs to Record & verify the output result against each given input.</p>

Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to construct and verify the truth table of RS latch using NAND gate and clocked RS latch using NAND gate.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Connect LEDs to outputs pins.			
2. Apply different logic inputs to Record & verify the output result against each given input for RS latch and clocked RS latch.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Assessment Task 2	Description of Assessment Task 2 Candidate is required to verify function of D flip flop and JK/T flip flop		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Connect LEDs to outputs pins.			
2. Apply different logic inputs to Record & verify the output result against each given input.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Construct and Verify Function of Flip Flops	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define SR Latch?	
2. What is difference between Latch and flip flop?	
3. Define clock pulse?	
4. Which gate is used in JK flip flop?	
5. What is difference between synchronous & asynchronous input	

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
6. Define JK/T flip flop.	

ANSWER KEY

Sr.	Answers
1.	An SR latch made from two NAND gates. An SR latch (Set/Reset) is an asynchronous device
2.	The difference between a latch and a flip-flop is that a latch is level-triggered (outputs can change as soon as the inputs changes) and Flip-Flop is edge-triggered (only changes state when a control signal goes from high to low or low to high).
3.	A signal used to synchronize the operations of an electronic system. Clock pulses are continuous, precisely spaced changes in voltage.
4.	Two NAND gates are used in JK flip flop.
5.	Synchronous inputs are those whose effect on the flip-flop output is synchronized with the clock input. (e.g R, S, J, K). Asynchronous inputs are those that operate independently of the synchronous inputs and the input clock signal.
6.	T flip-flop (Toggle) is modified version of JK flip-flop. JK inputs of JK flip-flop combine together to form a single input T. This flip-flop is called T flip-flop.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Use 555 IC as Multivibrator

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Use 555 IC as Multivibrator	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to construct 555 IC as A-stable Multivibrator and Mono-stable Multivibrator.</p> <p>Assessment Task 2: Candidate is required to construct 555 IC as Bi-stable Multivibrator.</p> <p>And complete:</p> <p>7. Knowledge assessment test (Written or Oral)</p> <p>8. Portfolios at the time of assessment (if any)</p>
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Draw circuit diagram for A-stable Multivibrator</p> <p>Performance Criteria 2: Draw circuit diagram for Mono-stable Multivibrator</p> <p>Performance Criteria 3: Place 555 IC on bread board/trainer</p> <p>Performance Criteria 4: Make connection as per diagram.</p> <p>Performance Criteria 5: Apply voltage to circuit and give triggering pulse at input pin.</p> <p>Performance Criteria 6: Record the output signal wave shape from oscilloscope.</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Draw circuit diagram for Bi-stable Multivibrator</p> <p>Performance Criteria 2: Place 555 IC on bread board/trainer.</p> <p>Performance Criteria 3: Make connection as per diagram.</p> <p>Performance Criteria 4: Apply voltage to circuit and give triggering pulse at input pin.</p> <p>Performance Criteria 5: Record the output signal wave shape from oscilloscope.</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to construct 555 IC as A-stable Multivibrator and Mono-stable Multivibrator.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Draw circuit diagram for A-stable Multivibrator			
2.	Draw circuit diagram for Mono-stable Multivibrator			
3.	Place 555 IC on bread board/trainer			
4.	Make connection as per diagram.			
5.	Apply voltage to circuit and give triggering pulse at input pin.			
6.	Record the output signal wave shape from oscilloscope.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to construct 555 IC as Bi-stable Multivibrator.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Draw circuit diagram for Bi-stable Multivibrator			
2.	Place 555 IC on bread board/trainer.			
3.	Make connection as per diagram.			
4.	Apply voltage to circuit and give triggering pulse at input pin.			
5.	Record the output signal wave shape from oscilloscope.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Use 555 IC as Multivibrator	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define basic elements of 555 timer IC.	
2. Define stable Multivibrator?	
3. Define nonstable Multivibrator?	

ANSWER KEY

Sr.	Answers
1.	555 timer ic is a bipolar 8pin mini dip device, it consist of 25 transistors, 2diodes, 16 registers to form two comparators ,a flip flop and high current output.
2.	Stable Multivibrator in which circuit is stable in either state. It can be flipped from one state to the other by an external trigger pulse. This circuit is also known as a flip-flop.
3.	Nonstable Multivibrator: This multivibrator will not be stable in both the states; it will rapidly get switches from one state to another state.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

**Construct Shift Registers and Counters with
the Help of Flip Flops**

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Construct Shift Registers and Counters with The Help of Flip Flops	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to construct a 4-bit shift register by Using Flip Flops and troubleshoot the faults.</p> <p>Assessment Task 2: Candidate is required to construct 4-bit binary and synchronous Counter with D Flip-Flops and troubleshoot the faults.</p> <p>And complete:</p> <p>9. Knowledge assessment test (Written or Oral)</p> <p>10. Portfolios at the time of assessment (if any)</p>

Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Draw circuit diagram 4-bit register.</p> <p>Performance Criteria 2: Make connection of D-Flip Flop as per diagram to construct 4-bit shift register.</p> <p>Performance Criteria 3: Apply data at the input of register and give clock pulse.</p> <p>Performance Criteria 4: Make connection of JK-Flip Flop as per diagram to construct 4-bit binary counter.</p> <p>Performance Criteria 5: Recode the output according to the input.</p> <p>Performance Criteria 6: Identify faults in different combinational logic circuits IC's.</p> <p>Performance Criteria 7: Troubleshoot the faults.</p>
	<p>Assessment Task 2</p> <p>Performance Criteria 1: Draw circuit diagram synchronous counter.</p> <p>Performance Criteria 2: Make connection of JK-Flip Flop as per diagram to construct 4-bit synchronous counter.</p> <p>Performance Criteria 3: Make connection of JK-Flip Flop as per diagram to construct 4-bit binary counter.</p> <p>Performance Criteria 4: Connect LEDs to the output pins.</p> <p>Performance Criteria 5: Apply the clock pulse and record the output.</p> <p>Performance Criteria 6: Identify faults in different combinational logic circuits IC's.</p> <p>Performance Criteria 7: Troubleshoot the faults.</p>

Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to construct a 4 bit shift register by Using Flip Flops and troubleshoot the faults.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Draw circuit diagram 4-bit register.			
2. Make connection of D-Flip Flop as per diagram to construct 4-bit shift register.			
3. Apply data at the input of register and give clock pulse			
4. Make connection of JK-Flip Flop as per diagram to construct 4-bit binary counter.			
5. Recode the output according to the input.			
6. Identify faults in different combinational logic circuits IC's.			
7. Troubleshoot the faults.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to construct 4-bit binary and synchronous Counter with D flip-Flops and troubleshoot the faults.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Draw circuit diagram synchronous counter.			
2.	Make connection of JK-Flip Flop as per diagram to construct 4-bit synchronous counter.			
3.	Make connection of JK-Flip Flop as per diagram to construct 4-bit binary counter.			
4.	Connect LEDs to the output pins.			
5.	Apply the clock pulse and record the output.			
6.	Identify faults in different combinational logic circuits IC's.			
7.	Troubleshoot the faults.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Construct Shift Registers and Counters with The Help of Flip Flops	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define function of registers, and counters in digital circuits	
2. Describe Basic computer memories and its types.	
3. Describe use of ESD equipment	
4. Differentiate hardware from software issues.	

ANSWER KEY

Sr.	Answers
1.	A register can hold data, and it can be used for temporary storage. A counter is a special case of a register. it can only be loaded, stored, or incremented, or used for the stack or as the program counter.
2.	Computer memory is of two basic types: Primary memory (RAM and ROM) and Secondary memory (hard drive, CD etc).
3.	ESD equipment works to actively neutralize the threat posed by static electricity by working to prevent ESD events, safely discharge static charges and, protect the environment and everything therein
4.	The differences between software and hardware are pretty simple to figure out. When it comes to software issues, they are usually easy enough to fix. ... When it's a hardware problem, it's usually more severe.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Configure Arduino

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure Arduino	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to Install Arduino IDE and Embed Code in Arduino to authenticate code by troubleshooting.</p> <p>Assessment Task 2: Candidate is required to control LED with Arduino and verify its connection.</p> <p>And complete:</p> <p>11. Knowledge assessment test (Written or Oral)</p> <p>12. Portfolios at the time of assessment (if any)</p>
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Install Arduino IDE</p> <p>Performance Criteria 2: Select Serial Port on which Arduino is connected</p> <p>Performance Criteria 3: Select the relevant board from tools.</p> <p>Performance Criteria 4: Verify the connectivity of board from computer</p> <p>Performance Criteria 5: Select and Run Basic Example Project as guided by instructor</p> <p>Performance Criteria 6: Burn the code on Arduino</p> <p>Performance Criteria 7: Identify that code is uploaded successfully.</p> <p>Performance Criteria 8: Troubleshoot configurations of Arduino IDE (If required)</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Connect LED to digital pin</p> <p>Performance Criteria 2: Burn blink code from example projects</p> <p>Performance Criteria 3: Check LED is blinking. If not, check its connection and rectify</p> <p>Performance Criteria 4: Connect LED to PWM pin</p> <p>Performance Criteria 5: Burn fade code from example projects</p> <p>Performance Criteria 6: Verify LED is fading</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to Install Arduino IDE and Embed Code in Arduino to authenticate code by troubleshooting.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Install Arduino IDE			
2.	Select Serial Port on which Arduino is connected			
3.	Select the relevant board from tools.			
4.	Verify the connectivity of board from computer			
5.	Select and Run Basic Example Project as guided by instructor			
6.	Burn the code on Arduino			
7.	Identify that code is uploaded successfully.			
8.	Troubleshoot configurations of Arduino IDE (If required)			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to control LED with Arduino and verify its connection.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Connect LED to digital pin			
2.	Burn blink code from example projects			
3.	Check LED is blinking. If not, check its connection and rectify			
4.	Connect LED to PWM pin			
5.	Burn fade code from example projects			
6.	Verify LED is fading			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure Arduino	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Define Arduino IDE.	
2. Difference between Analog pin and Digital pin.	
3. What is of Block Diagram?	
4. Define Microcontrollers.	

ANSWER KEY

Sr.	Answers
1.	IDE stands for Integrated Development Environment. It is an official software introduced by Arduino.cc that is mainly used for editing, compiling and uploading the code in the Arduino Device.
2.	A Digital PIN can turn an LED on or off, whereas an Analog pin can turn the same LED on to a variety of brightness levels, not just 1.
3.	A diagram showing in schematic form the general arrangement of the parts or components of a complex system or process, such as an industrial apparatus or an electronic circuit.
4.	A control device which incorporates a microprocessor.

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Configure NodeMCU

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure NodeMCU	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to Install, embed Code in NodeMCU and troubleshoot by configuring Arduino IDE.</p> <p>Assessment Task 2: Candidate is required to Control LED with NodeMCU and verify its connection.</p> <p>And complete:</p> <p>13. Knowledge assessment test (Written or Oral)</p> <p>14. Portfolios at the time of assessment (if any)</p>
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Connect NodeMCU board with computer</p> <p>Performance Criteria 2: Install NodeMCU Library in IDE (ESP-8266)</p> <p>Performance Criteria 3: Select and Run Basic Example Project as guided by instructor</p> <p>Performance Criteria 4: Burn the code on NodeMCU</p> <p>Performance Criteria 5: Identify that code is uploaded successfully. If not, check configurations of Arduino IDE and rectify</p> <p>Performance Criteria 6: Troubleshoot configurations of Arduino IDE (if required)</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Connect LED to digital pin</p> <p>Performance Criteria 2: Burn blink code from example projects</p> <p>Performance Criteria 3: Verify LED is blinking.</p> <p>Performance Criteria 4: Connect LED to PWM pin</p> <p>Performance Criteria 5: Burn fade code from example projects</p> <p>Performance Criteria 6: Check LED is fading. If not, check its connection and rectify</p> <p>Performance Criteria 7: Connect NodeMCU with your WIFI Router</p> <p>Performance Criteria 8: Check its output on Serial Monitor</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to Install, embed Code in NodeMCU and troubleshoot by configuring Arduino IDE.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Connect NodeMCU board with computer			
2. Install NodeMCU Library in IDE (ESP-8266)			
3. Select and Run Basic Example Project as guided by instructor			
4. Burn the code on NodeMCU			
5. Identify that code is uploaded successfully. If not, check configurations of Arduino IDE and rectify			
6. Troubleshoot configurations of Arduino IDE (if required)			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Assessment Task 2	Description of Assessment Task 2 Candidate is required to Control LED with NodeMCU and verify its connection.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Connect LED to digital pin			
2. Burn blink code from example projects			
3. Verify LED is blinking.			
4. Connect LED to PWM pin			
5. Burn fade code from example projects			
6. Check LED is fading. If not, check its connection and rectify			
7. Connect NodeMCU with your WIFI Router			
8. Check its output on Serial Monitor			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure NodeMCU	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Describe NodeMCUz	
2. What are the inputs and outputs of a NodeMCU?	
3. What are analog pins used for?	

ANSWER KEY

Sr.	Answers
1.	NodeMCU is an open source firmware for which open source prototyping board designs are available. The name "NodeMCU" combines " node " and "MCU" (micro-controller unit). The term "NodeMCU" strictly speaking refers to the firmware rather than the associated development kits.
2.	NodeMCU has 16 general purpose input-output pins on its board. SPI Pins. SD1, CMD, SD0, CLK. NodeMCU has four pins available for SPI communication.
3.	Analog pins are the ADC (analog to digital converter) input pins. They are used for reading analog voltage (between 0-5V on arduino, by default).

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Configure Raspberry Pi

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure Raspberry Pi	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to set-up Raspberry Pi by installing and writing script till the executing Basic Linux Terminal commands.</p> <p>Assessment Task 2: Candidate is required to set-up Programming Environment by installing, compiling and running any given example.</p> <p>And complete:</p> <p>15. Knowledge assessment test (Written or Oral)</p> <p>16. Portfolios at the time of assessment (if any)</p>
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Download Raspberry Pi OS on your Desktop.</p> <p>Performance Criteria 2: Burn Raspberry Pi OS in SD Card.</p> <p>Performance Criteria 3: Insert SD card in Raspberry PI.</p> <p>Performance Criteria 4: Attach Input Output devices required (Mouse, Keyboard)</p> <p>Performance Criteria 5: Install Raspberry Pi OS in Raspberry Pi.</p> <p>Performance Criteria 6: Write startup script for Raspberry Pi</p> <p>Performance Criteria 7: Execute Basic Linux Terminal commands (make directory, change path)</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Download GCC compiler through Terminal</p> <p>Performance Criteria 2: Install GCC compiler through Terminal.</p> <p>Performance Criteria 3: Compile and Run “Hello World” Example available on Internet.</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1	Description of Assessment Task 1 Candidate is required to set-up Raspberry Pi by installing and writing script till the executing Basic Linux Terminal commands.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Download Raspberry Pi OS on your Desktop.			
2. Burn Raspberry Pi OS in SD Card.			
3. Insert SD card in Raspberry Pi.			
4. Attach Input Output devices required (Mouse, Keyboard)			
5. Install Raspberry Pi OS in Raspberry Pi.			
6. Write startup script for Raspberry Pi			
7. Execute Basic Linux Terminal commands (make directory, change path)			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Assessment Task 2	Description of Assessment Task 2 Candidate is required to set-up Programming Environment by installing, compiling and running any given example.		
During the practical assessment, candidate demonstrated the following:	Yes	No	Remarks
1. Download GCC compiler through Terminal			
2. Install GCC compiler through Terminal.			
3. Compile and Run "Hello World" Example available on Internet.			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>	

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure Raspberry Pi	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Describe basic Linux Commands Like pwd,cd,mv	
2. Why we use Raspberry Pi?	
3. What are basic types of Microcontrollers?	

ANSWER KEY

Sr.	Answers
1.	pwd :the path of the current working directory cd: To navigate through the Linux files and directories, use the cd command mv: move files, although it can also be used to rename files.
2.	Because it is extremely low power draw, small form factor, no noise, solid state storage, and other features make it an attractive solution for a small and lightweight server.
3.	Some basic types of Microcontroller are 8051,AVR,PIC

Assessment Evidence Guide

For

“Jr. IoT Assistant”

Level-3

Configure ESP-32 with LORA

(Formative Assessment)



**National Vocational & Technical
Training Commission**

Instruction Sheet for the Candidate

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure ESP-32 with LORA	Assessment Date (DD/MM/YY): Assessment Time :		

Candidate Details	Name: Registration/Roll Number:
Guidance for Candidate	<p>To meet this standard, you are required to complete the following within the given time frame (for practical demonstration & assessment):</p> <p>Assessment Task 1: Candidate is required to perform connection of ESP-32 with LoRa Transceiver Module</p> <p>Assessment Task 2: Candidate is required to perform embedding Code in ESP-32 by running Basic WAN Project, authenticating code and troubleshoot Arduino IDE.</p> <p>And complete:</p> <p style="margin-left: 40px;">17. Knowledge assessment test (Written or Oral)</p> <p style="margin-left: 40px;">18. Portfolios at the time of assessment (if any)</p>
Minimum Evidence Required	<p>During a practical assessment, under observation by an assessor, you will complete:</p> <p>Assessment Task 1</p> <p>Performance Criteria 1: Do connections of ESP-32 and LoRa Transceiver Module</p> <p>Performance Criteria 2: Compare your connections with the circuit diagram provided by your Instructor</p> <p>Performance Criteria 3: Select the appropriate Serial Port</p>

	<p>Assessment Task 2</p> <p>Performance Criteria 1: Install LoRa Library (An Arduino library for sending and receiving data using LoRa Radios) in IDE.</p> <p>Performance Criteria 2: Select and Run Basic WAN Project on Sender and Receiver (ESP-32) as guided by instructor</p> <p>Performance Criteria 3: Burn the code on both ESP-32</p> <p>Performance Criteria 4: Verify that code is uploaded successfully.</p> <p>Performance Criteria 5: Troubleshoot Arduino IDE and rectify</p>
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Assessors Judgment Guide

(to be completed by the Assessor and signed both by the assessor and the candidate after the assessment)

Candidate Details	Name: Registration/Roll Number: Candidate Signature:.....
Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Assessment Summary (to be filled by the assessor)							
Activity	Method					Result	
Nature of Activity	Written	Oral	Observation	Portfolio	Role Play	Competent	Not Yet Competent
Practical Skill Demonstration			✓				
Knowledge Assessment	✓	✓					
Other Requirement							

Observation Checklist

Assessment Task 1		Description of Assessment Task 1		
		Candidate is required to perform connection of ESP-32 with LoRa Transceiver Module Arduino IDE.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Do connections of ESP-32 and LoRa Transceiver Module			
2.	Compare your connections with the circuit diagram provided by your Instructor			
3.	Select the appropriate Serial Port			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Assessment Task 2		Description of Assessment Task 2		
		Candidate is required to perform embedding Code in ESP-32 by running Basic WAN Project, authenticating code and troubleshoot Arduino IDE.		
During the practical assessment, candidate demonstrated the following:		Yes	No	Remarks
1.	Install LoRa Library (An Arduino library for sending and receiving data using LoRa Radios) in IDE.			
2.	Select and Run Basic WAN Project on Sender and Receiver (ESP-32) as guided by instructor			
3.	Burn the code on both ESP-32			
4.	Verify that code is uploaded successfully.			
5.	Troubleshoot Arduino IDE and rectify			
Competent <input type="checkbox"/>		Not Yet Competent <input type="checkbox"/>		

Knowledge Assessment

Title of Qualification: National Vocational Certificate Level 3 in IoT (Jr. IoT Assistant)	CS Code:	Level: 3	Version: 01
Competency Standard Title: Configure ESP-32 with LORA	Assessment Date (DD/MM/YY): Assessment Time: 30 min		

Guidance for Candidate	To complete your assessment for this Competency Standard, you need to answer the questions on the following pages successfully.
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Candidate Details	Name:..... Registration/Roll Number: Candidate Signature:.....
Written Assessment Outcome	COMPETENT <input type="checkbox"/> NOT YET COMPETENT <input type="checkbox"/> Name of the Assessor: Assessor's code: Signature of the Assessor:

Questions (Candidate confidently answered questions correctly and demonstrated understanding of the topics and their application)	
1. Basic Understanding of LoRa and ESP-32	
2. Describe Pin Configuration	
3. Difference between sender and receiver	
4. What is Packets switching?	

ANSWER KEY

Sr.	Answers
1.	It's a perfect, low-cost tool for monitoring a dozen-or-so LoRa devices, and relaying their messages up to the cloud. ESP32 LoRa 1-Channel Gateway
2.	Chip used with this board has 48 GPIO pins, but all pins are not accessible through development boards. ESP32 devkit has 36 pins and 18 on each side of the board
3.	Sender Encodes Idea in Message. To encode is to turn a message into a series of meaningful words and codes. And Receiver Decodes Message. .
4.	Packet is the small pieces of data, Packet switching is the transfer of small pieces of data across various networks.